IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants	:	R. Fischer et al.
Serial No.	:	10/765,249
Filed	:	January 27, 2004
For	:	COMBINATIONS OF ACTIVE INGREDIENTS WITH INSECTICIDAL AND ACARICIDAL PROPERTIES
Group Art Unit	:	1616
Examiner	:	

DECLARATION

Dr. Wolfgang Thielert hereby declares:

- that he is an agronomist having studied at the University of Bonn, Germany;
- that he received his doctor's degree in agriculture at the University of Bonn, Germany in 1984;
- that he entered the employ of Bayer in 1984;
- that he has specialized in plant protection (phytopharmacology);
- that the following tests have been carried out under his supervision and direction

Formula for the efficacy of the combination of two compounds

The expected efficacy of a given combination of two compounds is calculated as follows (see Colby, S.R., „Calculating Synergistic and Antagonistic Responses of Herbicide Combinations", Weeds 15, pp. 20-22, 1967):

If

X is the efficacy expressed in % mortality of the untreated control for test compound A at a concentration of m ppm,

Y is the efficacy expressed in % mortality of the untreated control for test compound B at a concentration of n ppm,

E is the efficacy expressed in % mortality of the untreated control using the mixture of A and B at m and n ppm,

then is

$$E = X + Y - \frac{X \times Y}{100}$$

If the observed insecticidal efficacy of the combination is higher than the one calculated as „E", then the combination of the two compounds is more than additive, i.e., there is a synergistic effect.

Example A

Heliothis armigera test

Solvent:	7 parts by weight of dimethylformamide
Emulsifier:	2 parts by weight of alkylaryl polyglycolether

To produce a suitable preparation of active compound, 1 part by weight of active compound is mixed with the stated amount of solvent and emulsifier, and the concentrate is diluted with emulsifier-containing water to the desired concentration.

Soybean shoots (*Glycine max*) are treated by being dipped into the preparation of the active compound of the desired concentration and are infested with larvae of the cotton boll worm (*Heliothis armigera*) as long as the leaves are still moist.

After the specified period of time, the mortality in % is determined. 100 % means that all the caterpillars have been killed; 0 % means that none of the caterpillars have been killed.

According to the present application in this test e.g. the following combinations show a synergistic effect in comparison to the single compounds:

Table A

plant damaging insects

Heliothis armigera - test

active compound	active compound concentration in ppm	mortality in % after 6d	
Diafenthiuron			
	20	40	
Spiromesifen			
	100	0	
Diafenthiuron + Spiromesifen (1:5)			
according to the invention		**obs.***	**cal.****
	20 + 100	**60**	**40**
Spinosad			
	0,16	10	
Spiromesifen			
	100	0	
Spinosad + Spiromesifen (1:625)			
according to the invention		**obs.***	**cal.****
	0,16 + 100	**90**	**10**

*obs. = observed insecticidal efficacy

** cal. = efficacy calculated with Colby-formula

Example B

Phaedon cochleariae - larvae

Solvent:	7 parts by weight of dimethylformamide
Emulsifier:	2 parts by weight of alkylaryl polyglycolether

To produce a suitable preparation of active compound, 1 part by weight of active compound is mixed with the stated amount of solvent and emulsifier, and the concentrate is diluted with emulsifier-containing water to the desired concentration.

Cabbage leaves (*Brassica oleracea*) are treated by being dipped into the preparation of the active compound of the desired concentration and are infested with larvae of the mustard beetle (*Phaedon cochleariae*) as long as the leaves are still moist.

After the specified period of time, the mortality in % is determined. 100 % means that all the beetle larvae have been killed; 0 % means that none of the beetle larvae have been killed.

According to the present application in this test e.g. the following combinations show a synergistic effect in comparison to the single compounds:

Table B

plant damaging insects
Phaedon cochleariae larvae - test

active compound	active compound concentration in ppm	mortality in % after 6d	
Fenpyroximate			
	4	10	
Spiromesifen			
	100	10	
Fenpyroximate + Spiromesifen (1:25)			
according to the invention			
		obs.*	**cal.****
	4 + 100	**50**	**19**
Spinosad			
known			
	0,16	25	
Spiromesifen			
known			
	100	0	
Spinosad + Spiromesifen (1:625)			
according to the invention			
		obs.*	cal.**
	0,16 + 100	70	25

*obs. = observed insecticidal efficacy
** cal. = efficacy calculated with Colby-formula

Example C

Plutella xylostella - test (sensible strain)

Solvent:	7 parts by weight of dimethylformamide
Emulsifier:	2 parts by weight of alkylaryl polyglycolether

To produce a suitable preparation of active compound, 1 part by weight of active compound is mixed with the stated amount of solvent and emulsifier, and the concentrate is diluted with emulsifier-containing water to the desired concentration.

Cabbage leaves (*Brassica oleracea*) are treated by being dipped into the preparation of the active compound of the desired concentration and are infested with larvae of the diamondback moth (*Plutella xylostella*/sensible strain) as long as the leaves are still moist.

After the specified period of time, the mortality in % is determined. 100 % means that all the caterpillars have been killed; 0 % means that none of the caterpillars have been killed.

According to the present application in this test e.g. the following combinations show a synergistic effect in comparison to the single compounds:

Table C

plant damaging insects
Plutella xylostella (sensible strain) - test

active compound	active compound concentration in ppm	mortality in % after 6d
Azocyclotin	100	0
Spiromesifen	100	30
Azocyclotin + Spiromesifen (1:1) **according to the invention**	**100 + 100**	**obs.* 95** **cal.** 30**

active compound	active compound concentration in ppm	mortality in % after 3d
Fenpyroximate	4	10
Spiromesifen	100	35
Fenpyroximate + Spiromesifen (1:25) **according to the invention**	**4 + 100**	**obs.* 85** **cal.** 41,5**

*obs. = observed insecticidal efficacy
** cal. = efficacy calculated with Colby-formula

Table C

plant damaging insects
Plutella xylostella (normal strain) - test

active compound	active compound concentration in ppm	mortality in % after 3d	
Fenazaquin			
	100	0	
Spiromesifen			
	100	0	
Fenazaquin + Spiromesifen (1 : 1)			
according to the invention		**obs.***	**cal.****
	100 + 100	**30**	**0**

active compound	active compound concentration in ppm	mortality in % after 6d	
Spinosad			
	0,032	80	
Spiromesifen			
	100	15	
Spinosad + Spiromesifen (1:3125)			
according to the invention		**obs.***	**cal.****
	0,032 + 100	**100**	**83**

*obs. = observed insecticidal efficacy
** cal. = efficacy calculated with Colby-formula

Table C

plant damaging insects
Plutella xylostella (normal strain) - test

active compound	active compound concentration in ppm	mortality in % after 6d	
Endosulfan			
known			
	4	15	
Spiromesifen			
known			
	100	50	
Endosulfan + Spiromesifen (1:25)			
according to the invention			
		obs.*	cal.**
	4 + 100	75	57,5

*obs. = observed insecticidal efficacy
** cal. = efficacy calculated with Colby-formula

Example D

Plutella xylostella test (resistant strain)

Solvent:	7 parts by weight of dimethylformamide
Emulsifier:	2 parts by weight of alkylaryl polyglycolether

To produce a suitable preparation of active compound, 1 part by weight of active compound is mixed with the stated amount of solvent and emulsifier, and the concentrate is diluted with emulsifier-containing water to the desired concentration.

Cabbage leaves (*Brassica oleracea*) are treated by being dipped into the preparation of the active compound of the desired concentration and are infested with larvae of the diamondback moth (*Plutella xylostella*/resistant strain) as long as the leaves are still moist.

After the specified period of time, the mortality in % is determined. 100 % means that all the caterpillars have been killed; 0 % means that none of the caterpillars have been killed.

According to the present application in this test e.g. the following combinations show a synergistic effect in comparison to the single compounds:

Table D

plant damaging insects
Plutella xylostella (resistant strain) - test

active compound	active compound concentration in ppm	mortality in % after 3d	
Fenpyroximate			
known			
	20	40	
Spiromesifen			
known			
	100	15	
Fenpyroximate + Spiromesifen (1:5)			
according to the invention			
		obs.*	cal.**
	20 + 100	80	49

*obs. = observed insecticidal efficacy
** cal. = efficacy calculated with Colby-formula

Example F

Spodoptera frugiperda test

Solvent:	7 parts by weight of dimethylformamide
Emulsifier:	2 parts by weight of alkylaryl polyglycolether

To produce a suitable preparation of active compound, 1 part by weight of active compound is mixed with the stated amount of solvent and emulsifier, and the concentrate is diluted with emulsifier-containing water to the desired concentration.

Cabbage leaves (*Brassica oleracea*) are treated by being dipped into the preparation of the active compound of the desired concentration and are infested with caterpillars of the fall army worm (*Spodoptera frugiperda*) while the leaves are still moist.

After the specified period of time, mortality in % is determined. 100 % means that all the caterpillars have been killed; 0 % means that none of the caterpillars have been killed.

According to the present application in this test e.g. the following combinations show a synergistic effect in comparison to the single compounds:

Table F

plant damaging insects
Spodoptera frugiperda - test

active compound	active compound concentration in ppm	mortality in % after 6d	
Fenpyroximate	100	25	
Spiromesifen	500	40	
Fenpyroximate + Spiromesifen (1:5)			
according to the invention		**obs.***	**cal.****
	100 + 500	**100**	**55**

*obs. = observed insecticidal efficacy
** cal. = efficacy calculated with Colby-formula

Example G

Tetranychus test (OP-resistant/dip test)

Solvent:	7	parts by weight of dimethylformamide
Emulsifier:	1	part by weight of alkylaryl polyglycolether

To produce a suitable preparation of active compound, 1 part by weight of active compound is mixed with the stated amount of solvent and emulsifier, and the concentrate is diluted with emulsifier-containing water to the desired concentration.

Bean plants (Phaseolus vulgaris) which are heavily infested with all stages of the two-spotted spider mite (Tetranychus urticae) are treated by being dipped into the preparation of the active compound of the desired concentration.

After the specified period of time, mortality in % is determined. 100 % means that all the spider mites have been killed; 0 % means that none of the spider mites have been killed.

According to the present application in this test e.g. the following combinations show a synergistic effect in comparison to the single compounds:

Table G

plant damaging mites

'Tetranychus urticae - test

active compound	active compound concentration in ppm	mortality in % after 7d	
Spinosad			
	4	0	
Spiromesifen			
	0,8	40	
Spinosad + Spiromesifen (5 : 1)			
according to the invention			
		obs.*	**cal.****
	4 + 0,8	**65**	**40**

*obs. = observed insecticidal efficacy

** cal. = efficacy calculated with Colby-formula

The undersigned declarant hereby declares that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

8.8.2006 Wolfgang Thielert

Date Dr. Wolfgang Thielert